



ROLE OF CONVENTIONAL HYSTEROSALPINGOGRAPHY IN EVALUATION OF FEMALE INFERTILITY

Radio-Diagnosis

Dr Sravanthi Sangana	PG, III Year, Department of Radio- Diagnosis, Pesimsr, Kuppam Chittoor, Andhra Pradesh-51742.
Dr R Ramesh Kumar	Professor And HOD, Department Of Radio-diagnosis, Pesimsr, Kuppam Chittoor, Andhra Pradesh-51742.
Dr M Sanjeev Kumar	Assistant Professor, Department Of Radio-Diagnosis, Pesimsr, Kuppam Chittoor, Andhra Pradesh-51742.
Dr Chintalacheruvu Nagapraneetha	PG, III Year, Department Of Radio-Diagnosis, Pesimsr, Kuppam Chittoor, Andhra Pradesh-51742.

ABSTRACT

Background: Infertility is a major problem throughout the world. The cause can be multifactorial, now a days many couples are seeking medical help for infertility. Hysterosalpingography plays an important role as part of the female infertility workup. **Materials And Methods:** A retrospective study was done in the department of Radiodiagnosis of a rural tertiary care hospital, Kuppam, India. All patients who were referred for hysterosalpingography study as part of infertility workup between June 2020 and December 2021 to the department of Radiodiagnosis were included in the study. **Results:** A total of 100 patients are included in the study. Out of 100 HSG examinations 61% were normal and the remaining 39% cases were abnormal. Tubal abnormalities were most common constituting 25% of total cases. Uterine abnormalities were about 14%. **Conclusion:** HSG is a very useful diagnostic tool in evaluating female infertility occurring due to structural abnormalities of uterus and fallopian tubes, thereby aiding in patients' infertility management. It is lesser invasive and cost effective compared to laparoscopy.

KEYWORDS

Hysterosalpingography (HSG), infertility, contrast, fluoroscopy, Uterine anomalies, fallopian tube.

INTRODUCTION

In India approximately 15-20% of couples are affected by infertility, which is defined as the inability to conceive after 1 year of regular unprotected sexual intercourse [1].

Male factor infertility constituting 45 %, female factors constituting for the rest 55% cases, out of which ovulation disorders (37 %) and tubal damage (18 %) [2]. A combination of several factors is found in approximately 20 % of all couples.

For normal human fertility, morphology of the uterus has to be normal and patent fallopian tubes are needed. The diagnosis of female infertility involves a variety of radiological investigations, such as conventional hysterosalpingography, transabdominal and transvaginal ultrasound, magnetic resonance imaging of the pelvis, etc.^{3,4}.

It is well recognised that hysterosalpingography is particularly effective at identifying cervical, uterine, and tubal causes of female infertility⁵.

Despite advancements in gynaecological imaging, the ready availability and cost effectiveness of HSG makes a key investigation in evaluation of female genital tract particularly in the initial diagnostic workup of female infertility in most developing countries⁶.

The present study was undertaken to study the role of HSG in evaluation of various pathologies related to female infertility.

MATERIALS AND METHODS

Study Design: Retrospective study.

Study Location: Department of Radiodiagnosis, PES Institute of Medical sciences and research, Kuppam.

Study Duration: June 2020 to December 2021.

Sample Size: 100 patients.

Inclusion Criteria

Patients with Infertility as the chief complaint.

Exclusion Criteria

Allergic to contrast and active pelvic inflammatory disease.

Procedure

The present study was retrospective study conducted from June 2020

to December 2021 with infertility being the chief complaint.

Patients were given appointment on 8th to 10th day of cycle and were advised to come on empty stomach. Initially pelvic scan was done, on the same day HSG was performed. Prior to the hysterosalpingogram test, each patient was instructed to empty their bladder. The procedure is briefly explained to the patient after entering the x-ray room and consent was obtained. To decrease the tubal spasm premedication with IV Buscopan 20mg and Atropine 0.6mg was given.

Patient was placed in the lithotomy position at the foot end of the table and using aseptic technique, a vaginal speculum was inserted after applying local anesthetic, uterine sound was passed for uterine size and direction assessment. Following cervical os cannulation with a Leech Wilkinson cannula, about 20 ml of 76% Urografin was injected slowly under fluoroscopic guidance. With the patient in the supine position, films were taken after injection of 5 ml of contrast to demonstrate morphology and contours of the uterine cavity and after injection of another 5 ml contrast medium will outline the cornua, isthmus and ampullary portions of the tubes, as well as to show the extent of spillage into the abdominal cavity and the patency of the tubes.

Following contrast administration, four radiographs are taken in each patient which includes images of the early and complete filling phases of the uterine cavity, the outline of the fallopian tubes and the spillage of contrast into the abdominal cavity.

The size and morphology of the uterine cavity were assessed which includes searching for uterine filling defects, contour abnormalities of the cavity as well as abnormal positioning also the presence and patency of tubes.

Tubal pathologies like occlusion (one- or two-sided, proximal and distal, postsurgical, spasm), tubal irregularity (postinfectious) and peritubal adhesions (e.g., PID) were assessed.

The degree and distribution of contrast spillage were recorded. Abnormalities of the uterine cavity were categorised into Müllerian duct anomalies (e.g., uterus bicornis) and filling defects (myoma, scars/adhesions).

Statistical Analysis

The data will be entered into MS excel 2007 version and further analyzed using SPSS version 21. The categorical data will be analyzed using percentages.

RESULTS

The present study includes a total of 100 patients with age range between 18 and 40 years with mean age of about 25.3 years .

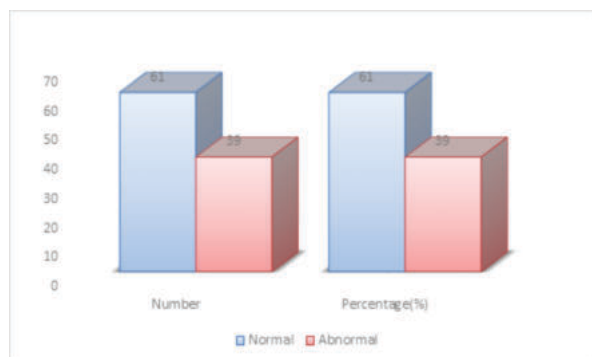
Normal Hysterosalpingography appearance i.e normal filling of uterus, fallopian tubes and peritoneal spillage of contrast was seen in 61% .

Fallopian tube abnormalities observed in 25% among which tubal block seen in 21 patients out of which bilateral tubal block seen in 5 patients ,right tubal block in 11 and left tubal block in 5 patients .Two patients had hydrosalpinx, 1 patient showed adhesions and one showed beaded appearance.

Uterine abnormalities like Mullerian duct abnormalities constitute 14% of total patients of which bicornuate uterine configuration observed in 6(8%) patients , bicornuate / septate in 2(2%) ,septate uterus in 2(2%) patient whereas 4(4%) patients had arcuate uterus.

Table 1: Showing distribution of normal and abnormal HSG findings(n= 100)

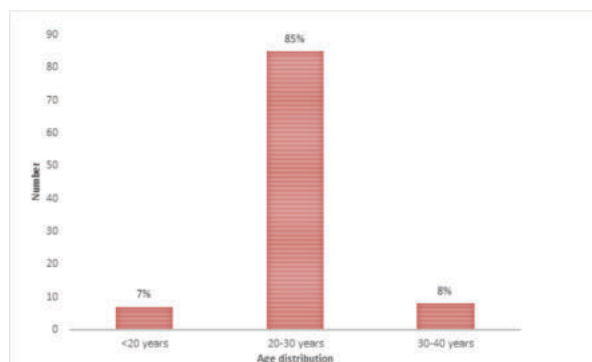
HSG Findings	Number	Percentage(%)
Normal	61	61
Abnormal	39	39
Total	100	100



Graph 1 representing distribution of normal and abnormal HSG findings

Table 2: Showing distribution of patients based on age(n= 100)

Age in years	Number	Percentage(%)
<20	7	7%
20-30	85	85%
30-40	8	8%
Total	100	100

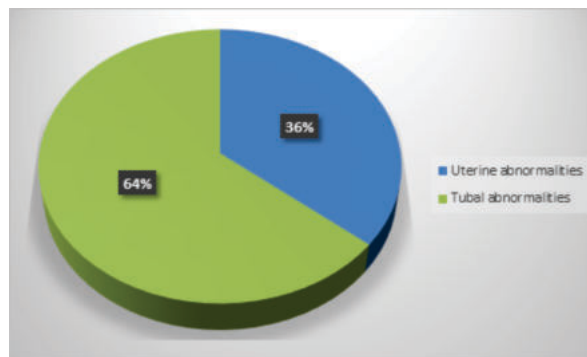


Graph 2 showing distribution of patients based on age

Table 3 : Showing number of Uterine and Tubal abnormalities (n=100)

Abnormal findings	Number of cases	Percentage(%)
Uterine abnormalities	14	14%
Tubal abnormalities	25	25%

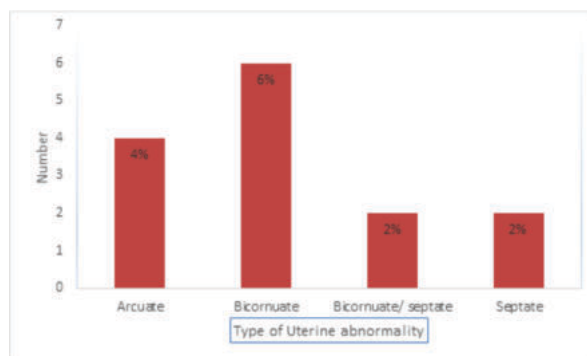
Uterine abnormalities	14	14%
Tubal abnormalities	25	25%



Graph 3 showing number of uterine and tubal abnormalities

Table 4: Showing Number of Each Uterine Abnormalities(n=100)

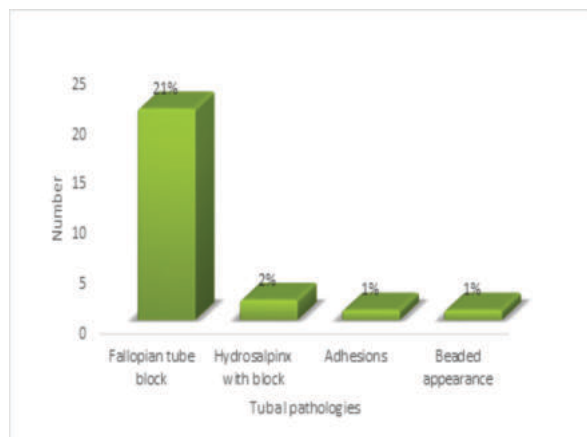
Type	Number
Arcuate	4
Bicornuate	6
Bicornuate/ septate	2
Septate	2



Graph 4 showing Number of Each Uterine Abnormalities

Table 5: Showing Number of Each Tubal Abnormalities

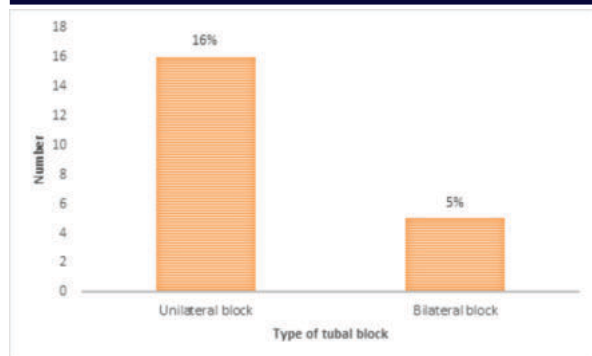
Tubal pathology	Number
Fallopian tube block	21
Hydrosalpinx with block	2
Adhesions	1
Beaded appearance	1



Graph 5: Showing Number of Each Tubal Abnormalities

Table 6: Showing Number of Unilateral / Bilateral Fallopian Tube Block

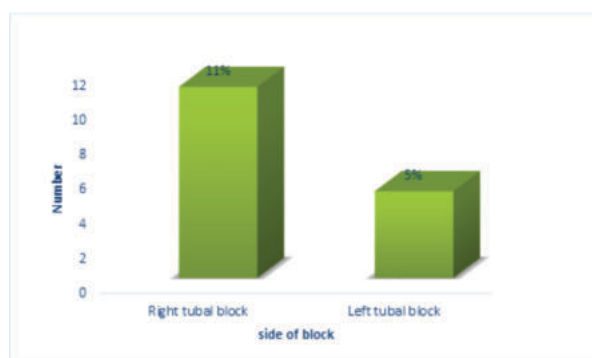
Type of tubal block	Number
Unilateral	16
Bilateral	5



Graph 6 showing Number of Unilateral / Bilateral Fallopian Tube Block

Table 7: Showing Number of Cases of Right and Left Unilateral Block

Side	Number
Right	11
Left	5



Graph 7 showing Number of Cases of Right and Left Unilateral Block

DISCUSSION

Infertility affects one of every seven reproductive couples constituting significant proportion of population resulting in significant burden on the affected family. Infertility rates are rising due to increased prevalence of male infertility and delay in child bearing in females. Infertility due to female factor can be due to structural or functional abnormalities involving uterus, cervix, fallopian tubes, ovaries and endocrine disorders. About 35 to 40 percent of infertility problems are caused by tubal diseases, either as a result of an infection or surgical injury. Hysterosalpingography, a fluoroscopic technique, is used to assess the morphology of the uterus, cervix, and fallopian tube patency. It is simple, inexpensive and non invasive and is considered as good diagnostic modality to detect tube abnormalities in infertile patients⁷.

At times HSG is also useful as therapeutic procedure in relieving small tubal blocks.

In Mallarini G et al. study, patients were divided into two groups with one group receiving two consecutive HSGs and the other receiving both HSG and tube recanalization. They concluded that the therapeutic efficacy of two consecutive HSG followed each other after four weeks compared with the fallopian tube recanalization are similar when the second HSG shows the presence of Fallopian tube patency⁸.

KA Broeze et al conducted metaanalysis and concluded that HSG considered to have a high sensitivity and specificity constituting 53% and 87% respectively for any tubal pathology and 95% for bilateral bilateral tubal pathology⁹.

In the present study the mean age of patients presenting with infertility is 25.3 years which is less compared to a study conducted by H Toufig et al¹⁰ where mean age was 31.7 years and in another study conducted by J Tan et al¹¹ with mean age of about 30.6 years. This earlier age of presentation could be due to awareness of medical help in infertility at

the rural level.

In our study, 61% of cases show normal findings on HSG which is similar to 62% by Behroozi¹² H et al and 55% in a study conducted by AC Schankath et al¹³. This is less than 88 % in a study done by TM Kumari et al¹⁴.

Among the abnormal findings, tubal abnormalities are most common constituting 25% total studies (both normal and abnormal) and 64% of abnormal studies which is similar to 28 % by Santhalia PK et al⁷ and is less than 54.9% in CC Makwe et al¹⁵ study.

Tubal pathologies accounts for 48.9% and 35.1%, respectively, of all cases of female infertility, according to researches by Kiridi EK et al¹⁶ and Omidiji OA et al¹⁷.

In our study, unilateral tubal blockage is more common than bilateral blockage. Right tubal block is more common than left side which is similar to Udobi SI et al¹⁸ and J Tukur et al¹⁹ studies.

The sensitivity, specificity, and accuracy of HSG for the identification of unilateral and bilateral tubal blockage were, respectively, 75%, 91.2%, 89.5%, 75%, 97.2%, and 96.6%, according to a research by F Gharekhanloo et al²⁰. Additionally, HSG had false-positive and false-negative rates of 8.7% and 25% for the diagnosis of unilateral and bilateral tubal blockage, respectively.

In the present study, uterine abnormalities constituted 14% of all the women presenting with infertility. According to a study by MI Khan et al²¹, uterine anomalies constitute 10% in infertile women. The most common uterine anomaly in our study is a bicornuate uterus which is similar to Huma Nishat et al²² study.

CONCLUSION

Hysterosalpingography is a safe, less invasive and cost effective especially in developing countries like ours. HSG should be the initial investigation in the diagnosis of female infertility even though laparoscopy is the gold standard for determining the patency of the tubes because it provides information about the uterine cavity and fallopian tubes with fewer complications and can be completed as an outpatient procedure.

The most frequent abnormality in the present study is the tubal factor. In our country, TB and pelvic inflammatory illnesses are the most common causes of tubal block, which must be taken into consideration. The treatment will be planned in accordance with the results of the HSG and the clinical history, which helps to improve female infertility.

Advanced infertility treatments like gamete intrafallopian tube transfer requires patent fallopian tubes where HSG outlines fallopian tubes and demonstrates normal patency and communication with peritoneal cavity.

In the present study, uterine anomalies were also found where identification of them is important for procedures like IVF for successful outcome. HSG aids in diagnosing uterine anomalies that helps in surgical correction thereby improving fertility chances.

Based on the aforementioned benefits, clinicians must consider HSG as a baseline investigation in female infertility.

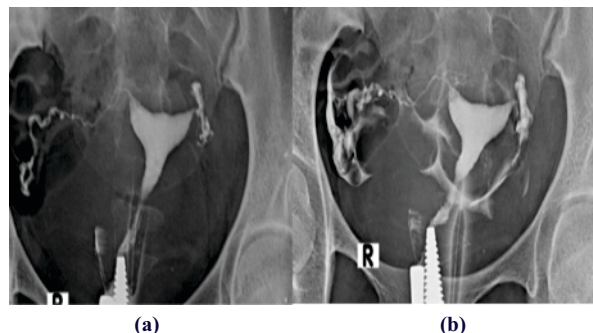


Fig 1 : Normal Uterus showing (a) Opacified Uterus and both fallopian tubes (b) Free intraperitoneal spillage of contrast material on both sides.

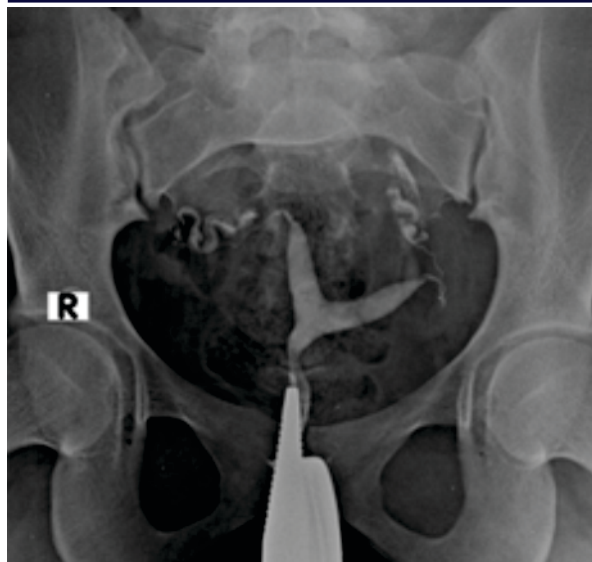


Fig 2: Septate/ Bicornuate Uterus(angle 85 degrees) with normal contrast spillage on both sides.



Fig 3: Patient showing septate configuration of Uterus with angle between two horns is <75 Degree.

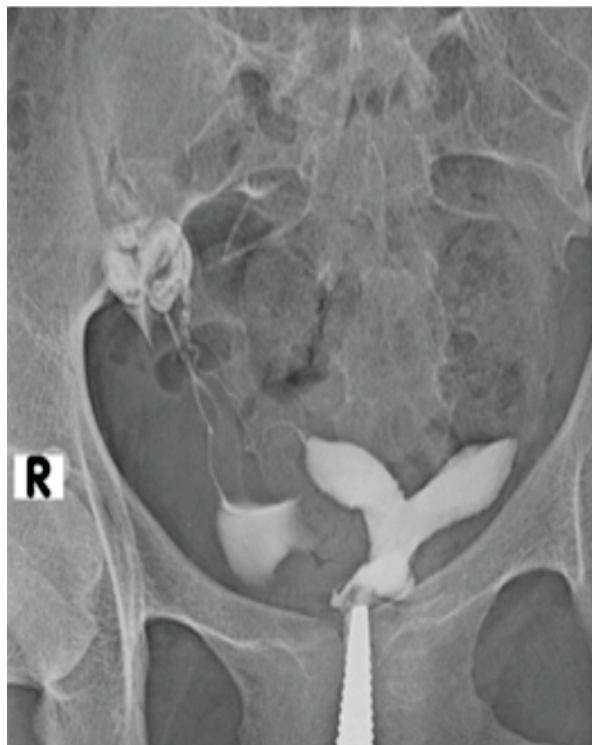


Fig 4: Bicornuate uterus (angle 105 degrees) with normal spillage of contrast on both sides.

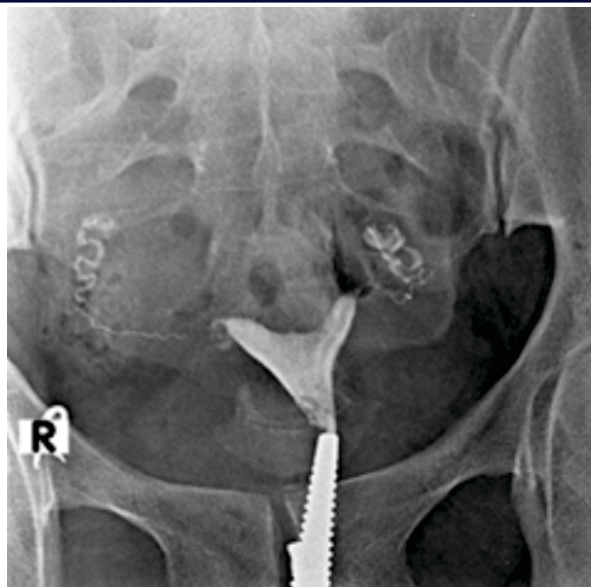


Fig 5: Arcuate Uterus with normal spillage of Contrast on both sides.

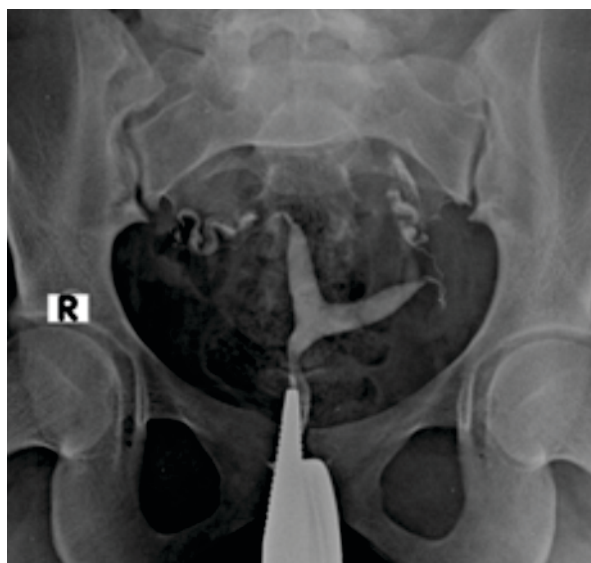


Fig 6: HSG showing right tubal block with no spillage of contrast

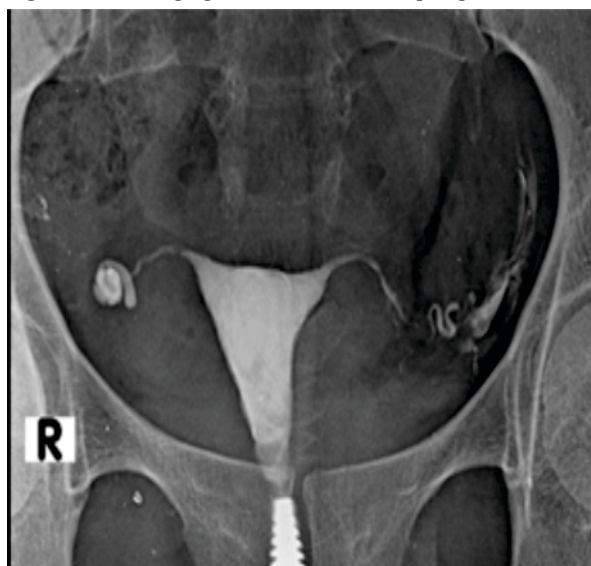


Fig 7: Right tubal block in the ampullary region with hydrosalpinx. Left tube shows normal spillage of contrast.



Fig 8: Beaded appearance in the distal third of bilateral fallopian tubes – Strictures.

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